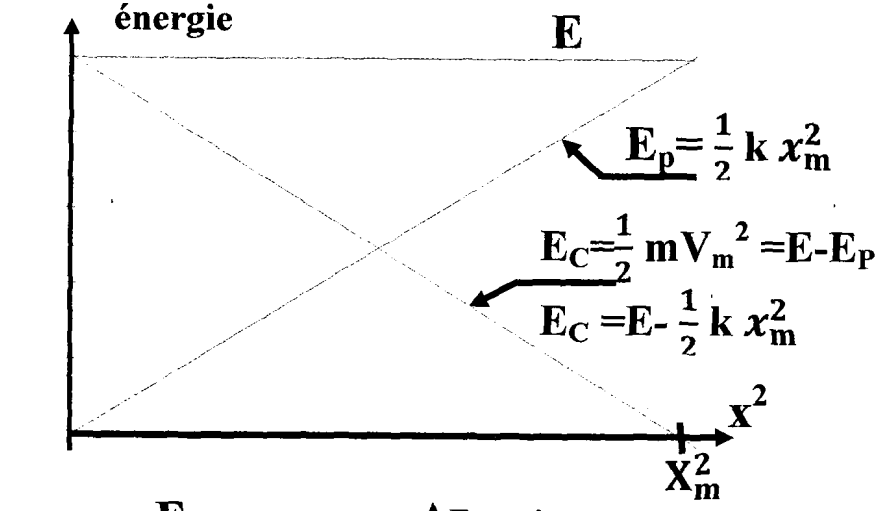
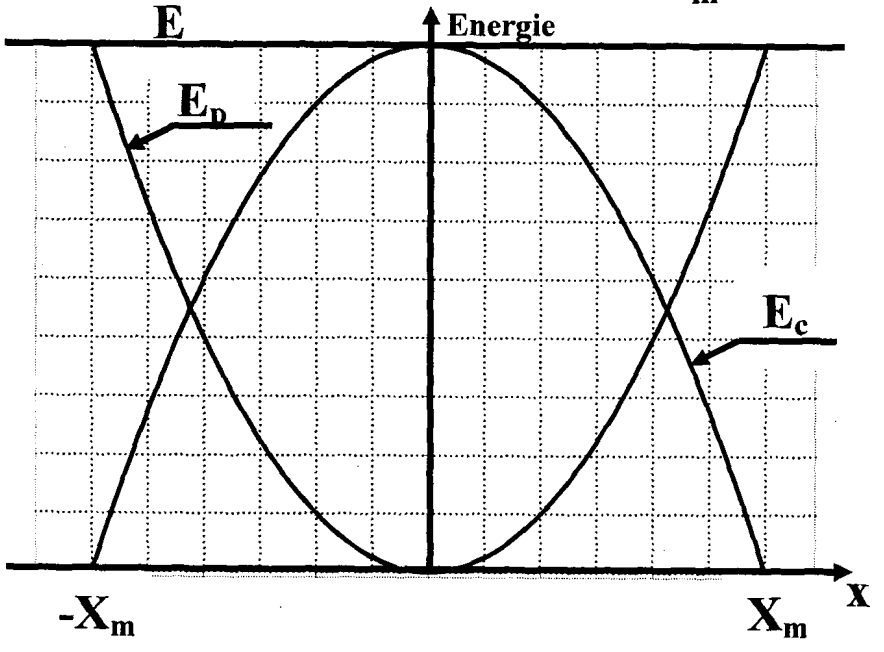
Remarque :

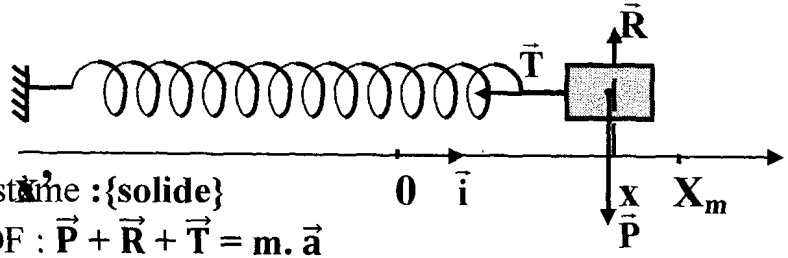




Exercice N° 5 :

A-

1°)



Système :{solide}

RDF : $\vec{P} + \vec{R} + \vec{T} = m.\vec{a}$

Projection de la RFD sur l'axe– $kx = ma \Rightarrow ma + kx = 0$

$\Rightarrow \frac{d^2x}{dt^2} + \frac{k}{m}x = 0$

La solution de cette équation différentielle est $x(t)=X_m\sin(\omega_0 t + \varphi_x) \Rightarrow$ le mouvement est rectiligne sinusoïdal

2°) $T_0 = 2\pi\sqrt{\frac{m}{k}} = 2\pi\sqrt{\frac{0,2}{20}} = 0,2\pi = \frac{2}{10}\pi\ s$

3°) $E_p = \frac{1}{2}kx^2 = \frac{1}{2}kX_m^2\sin^2(\omega_0 t + \varphi_x)$

4°)

a- $T = \frac{\pi}{10} = \frac{T_0}{2}$

b- $E_{p_{max}} = \frac{1}{2}kX_m^2 = 1,6.10^{-4}J$

$X_m = \sqrt{\frac{2.1,6.10^{-4}}{20}} = 4.10^{-2}m$

$x(t) = X_m\sin(\omega_0 t + \varphi_x)$